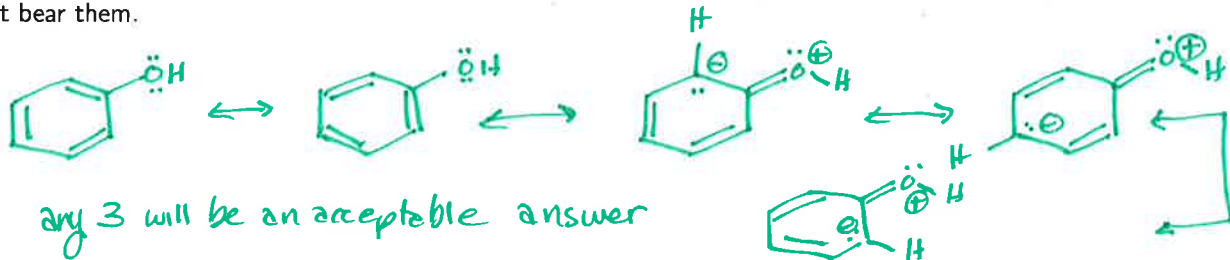


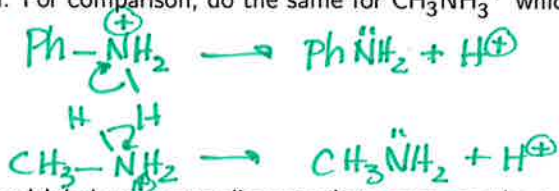
Quiz A

1. Draw three important resonance forms for phenol, PhOH. Show all lone pairs and any formal charges on the atoms that bear them.

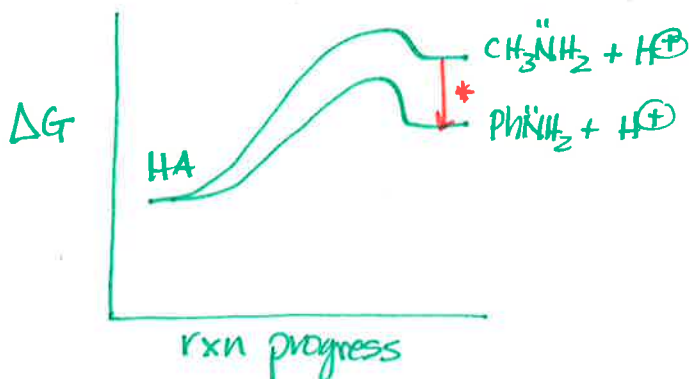


2. As you know, typical ammonium ions have pK_a s in the 9-12 range. One really stunning exception is the anilinium ion, PhNH_3^+ whose pK_a is 4.6 (as strong as a carboxylic acid!).

- (a) Write and balance the reaction of the anilinium ion acting as an acid. Include mechanistic arrows where needed. For comparison, do the same for CH_3NH_3^+ which will represent a typical ammonium ion.

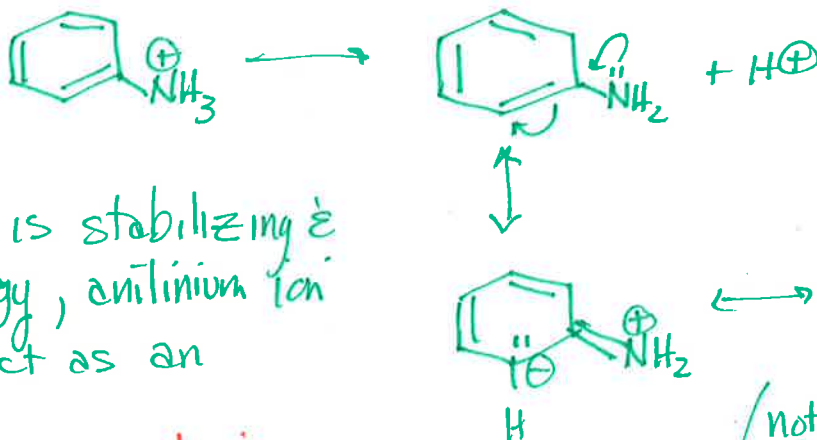


- (b) Draw and label an energy diagram that compares the two reactions you wrote above, and that reflects the relative pK_a s. Put the acids at the same energy level, and show any energy differences on the base side of the reaction.



- (c) All of the above is *descriptive*, it illustrates or expresses what we know about the system. Now explain *why* anilinium ion is such a strong acid compared to typical ammonium ions. Think before you write and do not ramble. An illustration may be valuable.

If anilinium ion gives up its proton, it gains resonance:



Since resonance is stabilizing & lowers the energy, anilinium ion is keen to act as an acid

* energy drop due to having resonance as an option

3 more res. forms

(note similarity to phenol example above)